

Device for Climbing

The invention is for a device for climbing on flexible or rigid structures.

Equipment for climbing with grips for ropes are known from DE 1972603 A1 and DE 19643455. A disadvantage of the technical solutions provided in these patent applications is that the demand for greater functional safety and the possibility of easy ascent and descent for the climbing person can only be attained with great technical effort.

The task of the invention is therefore to allow for a complete functional safety and energy-saving climbing, especially for persons on the ropes and rigid structures.

This task is solved with a device with the characteristics of the claims 1 to 15.

The invented device has the special advantage that it meets the ergonomic requirements and with their aid it is possible to use the power of the entire body to climb. It is even suitable for inexperienced climbers and it is easy to learn to handle.

The climbing device guarantees a high degree of working safety, which is even provided with improper use.

The invention will be explained in detail on the basis of figures 1 to 6 using three implementation examples:

- Fig. 1 an invented clasp as principle view;
- Fig. 2 Illustration of the cross-section of the invented clasp
- Fig. 3 Another form of the invented clasp – cross section
- Fig. 4 Side view of a climbing device according to the invention
- Fig. 5 Another form of the climbing device according to the invention
with seat
- Fig. 6 Another form of the climbing device according to the invention
with harness

Implementation Example 1

This should serve to explain the function of the invented climbing device on the basis of fig. 4.

Fig. 4 shows a climbing device as it could be used to rescue persons. The basis of the climbing motion is the moving characteristic of clasps 4 and 6. If an attacking force is directed downwards on clasps 4 and 6 (the clasp is burdened with the weight of the climbing person, for instance). Rope 1, here the weight-bearing element, is clamped in clasps 4 and/or 6. If one of the clasps, either 4 or 6, is relieved of the downward force, it can be moved along rope 1.

The upward climb is therefore realized as follows:

The two lower clasps 6 are first clamped in the two ropes 1 by the downward weight of the climbing device and the person. By pressing the two pedal levers downward the two upper clasps 4 are released, activated by means of their time servo component, and moved upward together with the climbing device along rope 1. If then the pedal levers 8 are released and the weight is put on the seat 7, the upper clasps 4 clamp down on the rope as a result of the downward force.

If the pedal lever is released, the recuperating spring 5 pulls the pedals 8 upward. This then releases the two lower clasps and the recuperating spring 5 moves upward on rope 1. The time servo-components 9 in the lower clasps 6 are activated with each release.

If the pedal levers 8 have returned to their initial top position, the lower clasps 6 again clamp on the ropes 1 after the delay is concluded. The entire cycle commences once again.

Descent is accomplished as follows:

The time servo-component of the invention is also decisive for descent. In this example is used as shock absorbers in clasps 4 and 6. If the weight is released from clasps 4 and 6, they only re-clamp on rope 1 after a short delay. This short delay is used for descent. The pedal lever 8 is briefly released and then pressed downward. Within the above-mentioned short delay the lower clasps 6 move downward with the pedal levers 8 along rope 1 and then clamp down on rope 1. Thereafter the upper clasp 4 is briefly released. Within the short period of time caused by the delay from the time servo-component the upper clasp 4 and therefore the seat 7 as well can move downward.

The clamping group can be released by the upward movement of the clasp. As can be seen in figs. 2 and 3, a short lifting of the yoke is sufficient to release the pressure between the parts. Needle cages and cotters 10 fall downward through their own weight in the component and the clasp is open.

Implementation Example 2

In the housing 21 of fig. 1 the incline bevels 2 are situated on the top so they can rotate and on the bottom butted up against the time servo-component. Between the incline bevels 2 and the cotter 10 there are rollers 11. At a prescribed height the rollers 11 press the cotters 10 against the rope 1 as a result of the geometric shape of the incline bevels, whereby the time servo-components are compressed. In this position the device is attached to the rope. The shifting of the device is made possible by releasing the same, whereby the rollers move back. The free movement of the device along the rope 1 is possible until the time servo-components 9 have assumed their original form until they are pressed by the rollers 11 and

the crotches 10 against the rope by the incline bevels 2 and the climbing process can start again.

Implementation Example 3

Figs. 5 and 6 show the invention for climbing for especially fast surmounting of heights.

The rope 1 runs through the clasps 4 and 6. Grips 22, and in their sleeves a stay bar, are attached to the upper clasps. Slits have been made in the housings of the clasps 4 in which form-locking connecting elements are hooked to which the system belt 13 is attached. The safety rope 14 is hooked in the above-mentioned connecting elements, whereby an unintentional release of the above-mentioned connecting elements from the clasps 4 can be hindered.

The seat 12 with the seatbelt 24 is attached to the lower ends of the system belt 13. The tension springs 16 are attached with their outer ends to the clasps 4 and 6 and with the inside ends to the seat 12. The rod 5 with the foot plate is hung, form-locked, in the clasps 6.

A stay-bar assures the required distance for climbing, for instance to the building.

Description of the actions of the climber:

The climbing person straps on the harness 23 and hooks the safety rope 14 in the above-mentioned connecting elements. In this way the person is protected from a fall. The seatbelt is then closed and the feet inserted in the foot-holds of the rod 5.

The force goes from the seat 12 through the system belt 13 and the closed clasps 4 to the rope 1.

When climbing the clasps 6 are moved upwards by means of the rod 5 with the aid of the low tension springs 16 after briefly weighting them. In this position the time servo-component 9 gives the impulse to close the clasps 6.

The climber can then shift their weight to the rod 5, stand up and push the clasps 4 upwards against the draw of the upper tension springs 16. Then the climber can sit down again and repeat the procedure again.

When descending the lower clasps 6 are pushed downwards until the legs are almost completely extended, as described above, after a short weighting and unweighting.

After clamping the lower clasps 6, the climber stands up and unweights the upper clasps 4 with their hands – thus releasing them - and then moves the clasps to shoulder height. After automatically clamping of the clasps 4 by means of the time servo-components 9, the climber sits and the procedure can be repeated again.

If the connection between the seat 12 and clasps 4 in the system belt is pressure-stable, the clasps 4 will, as described above, be pushed upwards without the use of the hands when the climber stands up.

Instead of the rod 5 it is possible to attach the clasps 6 directly to the shoes of the climber in a suitable manner, thus allowing an alternative climbing.

In fig. 6 the climbing device is shown without the seat. In this variation a harness is to be selected that has shoulder rings and allows sitting. To stabilize the climber the safety rope 14 is attaché do the back ring of the harness 23 and led through the shoulder rings of the harness.


The climbing device has the advantage of being able to be employed in many different ways.

It is useful for leisure-time activity and sports as well as for rescue and salvage operation whether in the mountains or for the fire department.

The climbing device is particularly advantageous for repair work, cleaning and other work on facades and buildings.

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List of parts

- 1 Rope
- 2 Inclined bevel
- 3 Yoke
- 4 Upper clasp
- 5 Rod
- 6 Lower clasp
- 7 Solid seat
- 8 Pedal lever
- 9 Time servo-component
- 10 Cotters
- 11 Rollers
- 12 Moveable seat
- 13 System belt
- 14 Safety rope
- 15 Draw element
- 16 Tension spring
- 17 Holder
- 18 Cam
- 19 Sleeve 
- 20 Pressure spring
- 21 Housing
- 22 Grip
- 23 Harness
- 24 Seatbelt